WHITE PAPER

A Multi-Site Deployment of DECY Cyclone Systems for Grain Cleaning Operations

Dueltron System Integration (Pty) Ltd

Dust Extraction and Pressurisation Systems (DEPS)

Project Title: Multi-Site DECY Cyclone Deployment for Grain Cleaning Operations
Client: Confidential – Pan-African Grain Processor
Project Lead: Dueltron DEPS
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Executive Summary

Dueltron System Integration (Pty) Ltd has maintained a long-term partnership with a leading Pan-African grain processor, supplying standardised DECY Cyclone systems for grain cleaning operations across multiple facilities throughout Southern Africa.

The client required a reliable and durable dust control solution capable of removing abrasive particulate matter generated during grain cleaning processes while maintaining operational consistency across all sites.

Despite sourcing grain cleaning equipment from an international OEM, the client selected Dueltron's DECY Cyclone technology as the preferred air pollution control solution due to its proven performance, low maintenance requirements, and long-term reliability.

To date, Dueltron has successfully designed, supplied, and installed more than ten identical cyclone systems across South Africa, Namibia, Zambia, and Zimbabwe. Each installation was engineered for a system volume of 12,000 m^3/h and included hot-dip galvanised construction, advanced airflow conditioning vanes, and sealed rotary valve discharge systems.

This standardised approach delivered operational consistency, simplified maintenance, and dependable long-term performance across multiple facilities.

1. Introduction

Modern grain cleaning operations generate significant volumes of dust, husks, shells, and lightweight particulate matter that must be effectively removed from the process airflow.

Without proper extraction and separation systems, facilities may experience:

- Reduced product quality
- Excessive airborne dust accumulation
- Increased equipment wear
- Poor working conditions
- Elevated maintenance requirements

The client required a high-efficiency cyclone separation system capable of supporting multiple grain cleaning facilities while maintaining identical operational standards throughout their regional operations.

DECY Cyclone installation providing dust separation and product recovery within a grain cleaning operation.

2. The Dueltron Solution

Dueltron supplied its proven DECY Cyclone technology specifically engineered for agricultural and grain processing applications.

Each system was designed to provide:

- Efficient particulate separation
- Stable airflow performance
- Minimal maintenance requirements
- Long-term corrosion protection
- Continuous dust discharge operation

The DECY Cyclone design incorporates advanced internal airflow geometry and static inlet vanes which assist with particle agglomeration and improved separation efficiency before material enters the main cyclone body.

Integrated cyclone and ducting arrangement designed for efficient dust capture and airflow management.

2.1 Optimised Cyclone Separation

The cyclone creates a controlled high-velocity vortex that forces heavier particles toward the outer walls of the cyclone body through centrifugal separation.

Collected material then descends into the discharge section while cleaned air exits vertically through the vortex finder.

This design assists in reducing re-entrainment and improves overall collection efficiency.

2.2 Static Inlet Vanes

Each DECY Cyclone incorporates strategically positioned static inlet vanes designed to stabilise airflow and improve particulate separation efficiency.

This airflow conditioning process assists with:

- Improved particle agglomeration
- Reduced turbulence
- Enhanced dust capture performance
- Stable system operation

2.3 Hot-Dip Galvanised Construction

All cyclone systems were manufactured using robust industrial-grade materials and finished with hot-dip galvanising for long-term corrosion resistance.

This construction method provides protection against:

- Abrasive grain dust
- Outdoor environmental exposure
- Corrosion in varied climates
- Long-term operational wear

3. Sealed Rotary Valve Discharge System

Each cyclone was fitted with a heavy-duty rotary vane feeder discharge system to maintain negative system pressure while continuously removing collected material.

The sealed discharge arrangement assists with:

- Airlock protection
- Stable cyclone performance
- Reduced air leakage
- Continuous operation
- Reliable waste discharge handling

Rotary valve discharge system maintaining continuous material removal while preserving cyclone efficiency.

4. Structural Support and Waste Handling

Dueltron supplied complete cyclone support structures engineered specifically for the application requirements of each facility.

The systems included:

- Structural support frames
- Rotary valve support arrangements
- Waste collection provisions
- Bulk bag handling capability
- Maintenance accessibility

This ensured efficient installation, operation, and maintenance across all sites.

5. Multi-Site Standardisation Strategy

The client implemented a standardised deployment strategy using identical DECY Cyclone systems across multiple facilities throughout Southern Africa.

This approach provided several operational advantages:

5.1 Operational Consistency

Maintenance teams and operators encountered identical systems across all facilities, simplifying operational procedures and training requirements.

5.2 Simplified Maintenance

Standardised components reduced spare part inventory requirements and simplified maintenance planning.

5.3 Proven Performance

Each installation delivered consistent and reliable dust separation performance across all operational sites.

5.4 Scalable Deployment

Dueltron's familiarity with the application allowed for streamlined installation, commissioning, and support for future projects.

6. Technical Specifications

Item	Specification
System Type	DECY Cyclone Separator
Application	Grain Cleaning Dust Extraction
System Volume	12,000 m^3/h
Construction Material	Hot-Dip Galvanised Steel
Discharge System	Rotary Vane Feeder
Installation Regions	South Africa, Namibia, Zambia, Zimbabwe

7. Broader Cyclone Capabilities

Dueltron's cyclone portfolio extends beyond the DECY model utilised in this project and includes:

- Various cyclone sizes and airflow capacities
- Multicyclone configurations
- Rotary valve and screw conveyor discharge systems
- Mild steel, stainless steel, and aluminium construction options
- Agricultural, mining, manufacturing, and industrial applications

8. Project Outcomes

The completed installations delivered:

- Reliable long-term cyclone performance
- Improved dust control within grain cleaning operations
- Reduced maintenance requirements
- Standardised operation across multiple facilities
- Improved workplace cleanliness and safety
- Simplified spare part management
- Long-term operational consistency

9. Conclusion

The continued deployment of Dueltron DECY Cyclone systems across multiple African grain processing facilities demonstrates the importance of reliable engineering and standardised industrial solutions.

By selecting Dueltron as the preferred dust control technology partner, the client achieved long-term operational consistency, simplified maintenance, and dependable dust extraction performance across its regional operations.

This project highlights Dueltron's ability to deliver scalable industrial ventilation and dust control systems for demanding agricultural and processing environments throughout Africa.

About Dueltron System Integration (Pty) Ltd

Dueltron delivers integrated environmental and automation solutions, including dust extraction, fume control, industrial ventilation, electrical panels, and automation systems. Our multidisciplinary teams engineer high-performance systems designed for safety, reliability, and efficiency.

Disclaimer

This document is provided for informational purposes only. System specifications, materials, and performance characteristics are project-specific and may vary.